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AN ADDRESS

INTRODUCTORY TO THE

COURSE OF LECTURES

IN THE

ST. LOUIS MEDICAL COLLEGE,

BY

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Prof. C. A. Pope.

Dear Sir:—At a meeting of the Students, held in the Lecture Room of the College, we were appointed a committee to solicit a copy of your Address for publication.

We also take the liberty of expressing our appreciation of the Lecture, and of renewing the manifestations of esteem with which the Class regard you.

We have the honor to be yours, &c.,

MONTROSE A. PALLEN,
A. MONTGOMERY,
GEORGE L. JACKSON,
C. C. FORBES,
JAS. H. WILLIAMS.

St. Louis, Nov. 2d, 1855.

Gentlemen—In accordance with your request, the manuscript of my Address is herewith placed at your disposal.

Allow me to return you and the Class my best thanks, and to offer them my sincere wishes for their health and prosperity.

Truly your friend,

CHAS. A. POPE.

Messrs. MONTROSE A. PALLEN,
A. MONTGOMERY,
G. L. JACKSON,
C. C. FORBES,
J. H. WILLIAMS,
Committee.

ADDRESS.

Man is a microcosm. The crowned head of created material beings, he epitomizes Nature, and images in himself all that is beneath him, in the inorganic and organic universe — in the mineral, vegetable and animal kingdoms. Materially, he is of the dust of the earth, the brother of the rocks and the mountains, of the rivers and the ocean, destined to act his part in the great drama of sentient, intellectual and moral existence, and then to return to the bosom of the earth, from which he sprang.

As a material being, he possesses the properties, and is subject to the laws of matter. Gravitation, impenetrability, indestructibility—whatever may be asserted of matter, may also be asserted of him. The atoms which compose his frame to-day, were once dormant in the soil or the rocks, floating in the seas, whispering in the zephyr, or careering in the storm-cloud — were reflecting the tints of the rose and violet, or performing functions in the inferior animals, thousands of years before his birth; and after having fulfilled their destiny with him, shall again mingle with the soil and the rocks, the zephyr and the storm — shall again be incorporated with the trees of the forest and the flowers of the field, with the lowly insect and the mighty animal. Yet, none of these myriad atoms shall be lost. He who congregated them in the organism of material man, follows them through all their ceaseless mutations, and can again call them from the mountain's height or the vasty deep. He,

> Who sees with equal eye, as God of all,
> A hero perish, or a sparrow fall,

is alike cognizant of the smallest atoms. They, as well as the winds and the waves, obey Him.

Rising from the comparative death of the inorganic world, into the active kingdoms of plants and animals, we find, as it were,

only the beginnings and archetypes of man. He includes them all, but is more excellent than they—they were created preparatory to his creation. The elements of organization are the same in them, as in him. Like theirs, his tissues and organs are composed of cells, whose marvellous transformations and mutations constitute the simplest as well as the most complex fabrics. The organic cell is the altar at which life and matter meet and are united. It is the basis of every organized structure—the organic unit of the vegetable and animal worlds, whether morphologically, anatomically, embryologically or geologically.

The humblest living forms are those of the simple cell—the primordial egg—the first-born of all that lives. Of these cells is thinking, feeling and intelligent man formed, as well as the creatures beneath him—the zoöphyte, the fish, the reptile and the quadruped—the cedars of Lebanon and the hyssop on the wall, as well as the huge leviathan and the infusorial animals too small for the naked eye.

The life of all is the same—whether of the Red Snow or the Gory Dew—of the tree or the protozoön—of the most elaborate tissues in the highest animals and in man himself. The cell consists of a fluid and a solid—a fluid containing nutrient matters, and a solid nourished by that fluid. The change of this fluid into the solid, is the act of nutrition, is the *sine qua non* of life. Wherever there is life, there are the solid and fluid—wherever there is nutrition, there are a solid and a fluid. So that the nutritive act is inseparable from life. Life indeed, in its simplest manifestation and last analysis, is nutrition, and it is the same in the entire series of living beings. The sap in vegetables answers to the blood of animals. The nutrient juice that nourishes the humblest twig, corresponds to the blood that stimulates the brain of the poet, the orator or the philosopher. The fluid that nourishes the tendril of the vine, answers to the blood that sustains the muscles of the Nemean lion. Man is the highest and last step in the organic scale, and resumes all that is beneath him. His life, like that of the humblest plant, and lowest animal, depends on a nourished solid and a nourishing fluid.

Unity and simplicity characterize all the works of the Creator. They obtain alike in the vegetable and the animal kingdoms. The simple leaf by its morphological changes, constitutes the ca-

lyx, the petals, stamens and pistils, which, having diverse forms and functions according to their position on the axis of the plant, may be compared to the homologous organs of animals: that is, an organ, fundamentally the same, developes in one case as a leaf, in another as a petal, in another as a stamen or a pistil, just as the arm of man, the fore leg of a quadruped, the wing of a bird, and the pectoral fin of a fish, represent one and the same organ. In vegetable as in animal growth one great thought underlies the whole structure. The thought has in it an element of infinity, but the mode of expression is necessarily finite. Thus the fractions which occur in Phyllotaxis, have become the subject of mathematical investigation, and the growth of plants has been reduced to a simple geometric formula. Not only so, but these same fractions correspond in a remarkable manner with the relative times of rotation of the successive planets of the solar system. Whence, asks Professor Pierce, the discoverer of this beautiful law, could this extraordinary coincidence have arisen, but from the action of a single mind; and what does it indicate but that the same word which created the planet is expressed in the plant?

Rising from the kingdoms of vegetables and the inferior animal forms, let us enter the great province of the vertebrate subdivision of living beings. These are the highest forms of animals, and include fishes, reptiles, birds and mammals. Man is the highest of the vertebrate or back-bone animals—the last developement of the highest, the mammalian order of the subkingdom. As in vegetable, and the lower animals, the invertebrate Radiata, Mollusca and Articulata—the star-fishes, snails and insects, there is found one simple and general plan of structure peculiar to each class, so in the vertebrata there exists but one type of organization, every modification of which is in direct relation to the habits and well-being of the species. All the members of each type, however diversified among themselves, can be reduced to one simple formula—to one simple expression. Led by the study of morphology, or the recognition of homologous organs, under whatever forms they may present, the Philosophical Anatomist has seized the relations of the bony elements, however much modified or specialized, and risen to the perception of this great general truth, the highest yet attained in the science of organization. Thus has the Archetype of the vertebrate skeleton

been evolved—showing in the most beautiful and admirable manner, the combination of unity of plan, with variety of purpose, by which is produced the endless diversity united with harmony of forms so remarkable in the animated world. Like those

> Truths of science, waiting to be caught,
> That float about the threshold of an age,

the full and perfect idea was but slowly grasped. The thought indeed struck Newton, whose great mind, reflecting on the simplicity and harmony of plan by which the universe is governed, conceived that principles of like uniformity might also govern the organized creation. Gœthe, the poet, started these investigations which have resulted in the establishment of the vertebral theory. But the first clue to this great discovery was obtained by the gifted and deep-thinking Oken. Ninety years ago, Vicq d'Azyr showed a correspondence between the posterior and the anterior extremities of animals. Before this, there was not an idea suggested as to the structure of the skeleton. That there existed any likeness between the structure of the skull and that of the vertebral column—that there was any resemblance between the form of the vertebræ and the organs of locomotion, so varied in different animals, never entered the mind of any anatomist, until Gœthe, and more especially Oken, Geoffroy, St. Hilaire, Carus, Cuvier and Owen had examined the question. As the fall of the apple to Newton, so to Oken was the blanched skull of a deer, stumbled on by accident, during a strolling walk. Contemplating its segmentary arrangement, like the vertebræ of the trunk, the truth flashed across his mind, and he exclaimed: "It is a vertebral column." Spix, too, caught a glimpse of the great law when he called the "maxillary arch" or the lower jaw, the "arm of the head." Cuvier thought lightly of such transcendentalisms, and called them mystical and unintellgible jargon. But we can easily forgive the Great Frenchman, as he first taught that the skeleton alone afforded a sufficiently satisfactory basis for the classification of animals—their constant internal framework, and not their variable external forms. This paved the way for the subsequent beautiful discoveries of the philosophical anatomists. As in astronomy the numerical harmonies of Kepler led to Newton's law of gravitation, so the labors of Cuvier

prepared the way for those of Oken and of Owen. Brilliant as were the discoveries of the illustrious Zoölogist, which enabled him, by the inspection of a mere fragment of bone, to trace the general features and habits of the animal to which it belonged—the antedeluvian saurian and mammal, at his magic touch, rising, reconstructed, from their rocky sepulchres of unnumbered ages—reluctant as we may be to admit it, they are nevertheless dependent on a principle entirely subordinate. His splendid achievements, seemingly the very acme of mental effort and philosophical induction, are but the individual consequences of a yet more comprehensive plan. The Cuvierian doctrine of the harmony of forms, or the co-existence of elements, applies well to questions of modifications, and special classes of animals, but not to whole sub-kingdoms, and still less to the entire animal creation. His principle is true so far as it goes, but falls short of that higher law of organic structure, developed by the philosophical anatomist. The vertebrate archetype is the profoundest truth in organic science—the final completion and last touch of the vertebral theory, received at the hands of the philosophic Owen. As gravitation, in the physical world, explains and coördinates a thousand apparently dissimilar and unanalagous facts, which touch each other by one side, and on the other diverge to infinity, so the archetype in the organized creation governs and accounts for the most discordant phenomena, and seemingly endless and extraordinary freaks. This great law of unity of composition applies, too, not only to those animals now living upon the surface of the earth, but likewise to those extinct genera, long entombed in the solid rock. And as the astronomer can calculate, with unerring certainty, the exact position in the heavens which any planet occupied thousands of years ago, so, by a reference to the vertebrate archetype, can the philosophical anatomist assign a place to those long extinct and extraordinary species, the Icthyosaurus, the Pterodactylus and the Megalosaurus, prophetic types, which sported in the floods, swarmed in the air, or trod the surface of the primal earth.

The highest mammal differs from the first Paleozoic fish, or lowest reptile, only in degree and variety of developement. The backbone, or vertebral column, is the part first formed in all. It

is the essential and fundamental portion; in a sense, it is the whole skeleton. It determines, in a great measure, the shape of the animal—affords, by its expanded and modified processes, cavities for the protection of the most important organs of the economy, limbs for prehension and locomotion, and is the centre and pivot of every action and motion of the body.

The vertebral column has its neural ring or arch to fold over and protect the spinal marrow and its prolongation, the brain; and its hæmal ring or arch, to enclose the blood-vessels and internal organs. The vertebra, with its symbolical embryonic sign of the figure 8, is common to all the four great classes of animals; and a man differs from a fish, a turtle, an eagle or a lion, physically speaking, only in the number and various developement of the vertebræ and their processes and contained organs. In the earliest stages of embryonic developement, the most accurate physiologist cannot distinguish between the embryos of a snake, a bird, a rabbit, and a man. At this rudimentary period, a man does not differ from a mouse. Both are organized beings, both are developed from cells, both have a backbone. In all these respects, both are alike. They differ only in their ultimate developement. The capital vertebræ of the one become the globular head, the dome of thought, the palace of the soul. Those of the other are less perfectly developed, and become the seat of a small brain and mere animal instincts. The processes which shoot out from the vertebræ, become, in one case, arms and hands, legs and feet, destined for the erect position, the motor and prehensive members of bimanous and biped man. In the other, they are fashioned into the humble limbs of the tiny quadruped.

Thus the special homologies of the "diverging appendage," from the fish to the highest of the mammalia, are easily recognizable, and can be traced, step by step, and almost bone for bone, from the simple unbranched pectoral ray of the Lepidosiren, through all their manifold changes, in the fins of whales and fishes, the false wing of the bat, the wing of the bird, the spade of the mole, the fore leg of the ox, the horse and the lion, up to that marvellous developement, and matchless harmony of adjustment, found in the human arm and hand, the fitting instrument of a rational being. And so of the ventral fins of fishes, the hinder limbs of animals, and the legs of man.

In the serpent these processes are not developed beyond the state of mere ribs, yet there is nothing, short of flight, done by the moving powers of other animals, that serpents cannot do by the vertebral column alone, which, to them, supplies, in the most remarkable manner, the place of hands and feet and fins. "It is true," says Owen, "that the serpent has no limbs, but it can outclimb the monkey, outswim the fish, outleap the jerboa, and suddenly loosing the close coils of its crouching spiral, it can spring into the air and seize the bird upon the wing. All these creatures have been observed to fall its prey. The serpent has neither hands nor talons, yet it can outwrestle the athlete and crush the tiger in the embrace of its ponderous overlapping folds. Instead of licking up its food, as it glides along, the serpent uplifts its crushed prey, and presents it grasped in the death coil, as in a hand, to its slimy, gaping mouth."

The limbs and jaws of animals, as well as those of man, are nothing more than modified ribs, themselves but processes of the vertebræ. Although it be not easy to seize, at once, the homology of a rib, a jaw, an arm, and a leg, in man; yet as all the vertebræ are among themselves, so also must their processes be, homologous. In embryology and the lower animals, we also have a solution of the difficulty. The posterior rudimentary feet of the Boa Constrictor, are ribs modified by being articulated, and differing from common ribs by terminating externally with a nail. The Salamander of Spain has ribs which pierce the fleshy walls of the chest, and terminate externally, each rib being furnished with a small straight nail. So the jaws of certain animals present such a similarity to the arrangement of the ribs, that they have been considered as ribs—ribs to the skull. The embryologist also shows us, that the changes in the formation of ribs and limbs are identical in their nature. Moreover, there issues from the nervous centres and between every two contiguous vertebræ, a pair of nerves accompanied by a pair of arteries. Every rib of the chest has one nerve and one artery. In the neck and loins of the higher animals, and of man, they form nervous plexuses and arterial trunks, which go also to their ribs, the extremities. In the serpent the ribs extend along nearly the whole length of the body, so that it is difficult to say where the neck ends and the back begins; whilst in man, and in nearly all

the vertebrates above fishes, the ribs are seemingly wanting in the neck and loins. They, however, really exist in these regions, the ribs here being merely consolidated, as it were, and assuming the form of extremities.

In a philosophical sense, therefore, the ribs being the hæmal arches of the vertebræ, the jaws are the ribs of the head, as the arms and legs are the ribs of the neck and loins. Or, with Spix, we may call the jaws the arms of the head, and the ribs the jaws or legs of the chest. Such expressions, though at first strange and even laughable, have yet a deep and significant meaning. But, in order to avoid such apparent contradiction in terms, they have been abandoned, and, as expressive of the manner in which the vertebræ at large are understood, the spinal processes are called the neural arches, and the ribs the hæmal arches of the vertebræ, which latter assume the form of jaws in the head, ribs in the chest, and extremities in the neck and loins.

The skull itself is but a few vertebræ variously developed. This is best seen in the lower vertebrates, as in fishes, the sheep and the deer; but in rising from them to the higher orders, it is clear that the same law holds in all. The head of the serpent, of the chelonian reptile, the bat, the eagle, the stag, the lion, the monkey, and man himself, consists of a few vertebræ so modified as to contain and protect the variously developed brain. In man there are four of these cranial vertebræ—the nasal, the frontal, the parietal, and the occipital. Their hæmal arches are the upper and lower jaws, the hyoid bone and the scapular arch, which, in all the vertebrates above the fishes, is detached and displaced towards the dorsal region.

Man, physically speaking, is the perfection of backbones, and includes all beneath him. His fins and wings and paws are arms and hands destined to obey the behests of the most developed of nervous centres. His capital vertebræ constitute a skull fit to contain the maximization of the brain, that of a Cuvier or a Webster. His facial angle, unlike that of the crocodile, the albatross, the dog, and the chimpanzee, approximates the rectangular measure, and that adopted by the ancient Greek artists (100°) as their beau ideal of the beautiful and the intellectual.

What endless varieties may be produced by a few elements! The twenty-six letters of the alphabet constitute all the libraries

of the world, with their poesies, philosophies, histories and logics. The material universe itself, with all its variety of sea and land, of cloud and sunshine, of day and night, of dark forest and cultivated plain, of metals, salts and earths, of plants and animals, of bleak desert and smiling vales of Tempe and of Sharon, is the the result of the varied combinations of some sixty-two or sixty-three simple substances. A few vertebræ, with their processes varied, constitute the entire vertebrate series, from the tiny minnow through all the range of whales and sea monsters, of lowly creeping things and lions, and hippopotami, up to the lord of all, man himself. Thus, by a few varying strokes of the chisel, the block of marble becomes a satyr or an Apollo Belvidere, a sphynx or a Farnese Hercules. Thus, by a few touches of his pencil, the painter converts the melancholy cast of features into a smile—the face of a man into that of a donkey. So, by various departures from the archetype, the animal is fitted to cleave the liquid element, to crawl or swim, to walk or leap upon the surface of the earth, or to soar aloft in the atmosphere. Thus, by a few variations in the vertebræ and their processes, the living being is a fish or a fowl, a snake or a turtle, a mouse or a mastodon, a monkey or a man.

Yet, notwithstanding man as a vertebrate ranks with the fishes and the reptiles, the beasts of the forest and fields, and the birds of the air, he differs from them all, widely, in species and genus, and even order. From the Chimpanzee, which approaches him more closely than any other animal, he is separated by an impassable gulf. He is not only different in genus, but different in order, from the highest and most intelligent of mammals. The Gorilla, whose skull and brain somewhat resemble his, is vastly inferior in the volume of brain, and is quadrumanous. Man alone is biped and bimanous. He is the perfection of the vertebrate developement. He alone walks erect and looks up to heaven as a suppliant, and abroad over the earth as a lord. He is the realization of the great idea shadowed forth in the creations of former periods—the culminating point in the material universe—the end and aim of the archetypal plan of the Creator.

Man is the sole species of his genus, the sole representative of his order. If in his physical organization he ranks with the beasts that perish, in his intellectual and moral faculties he

is only a little lower than the angels. Possessing a form of unrivalled majesty and beauty, "a front like Jove, to threaten and command—a station like the herald Mercury, new lighted on a heaven-kissing hill," he moves without a peer, the paragon of animals.

Although as a material and organized being, he stands doubtless at the top of the animal scale, yet, as we have seen, his inferiors in that scale furnish his archetypes in bony skeleton, in muscles, nerves, brain, and the other special organs. Physically, many of them are his superiors, as in strength, in agility, in the acuteness of the special senses, and in innate ability to bear the vicissitudes of the seasons. Of all animals, man comes into the world the most defenceless and dependent. He longer than any other requires the care and tenderness of parents. His organization is such as to separate him widely from all other animals, but his absolute superiority hardly appears from his organization alone. Deprived of his intellectual and moral nature, it is not easy to see what advantage he would possess over the monkey, the elephant, the lion, or even the fox. I know that it may be said, and that it is said, that it is in virtue of his organization that man is intellectually and morally the superior animal. There is truth in this proposition, but not the whole truth. No doubt that the size and form and quality of the brain have a great deal to do with intellectual and even moral manifestations. There is greater developement of the cerebral ganglia in man than in other animals; yet there are some things about man, things in which his superior nature consists—things which place him immeasurably above every other animal, which constitute an unvoyageable abyss between him and the highest of the mammalian order. There is that about man which is neither material, nor the mere function of organized matter.

It is contended that the vast intelligence of man differs from the instinct of animals only in degree—that intelligence is but a higher instinct, that instinct is but a lower intelligence; and that consequently, so far as intellect is concerned, the human and the brute differ only in degree. There must be, however, a difference in kind between the intelligence of man and that of the inferior animals. His intellect progresses, expands, developes itself, invents, generalizes—theirs remains forever fixed within the narrow

limits of instinctive impulse. One generation of animals is never wiser than another. They do not improve and advance the knowledge of their ancestors. The young quadruped never surpasses the old quadruped. There is no Young America, Young England, or Young Ireland with them. The ant still "toils for one poor grain," and husbands its store as in the days of Solomon, who pointed it out to man as an example of industry and frugality. The tiger and the cameleopard have the same habitudes now, that they had when they "bounded in the Flavian amphitheatre," or roamed untold centuries ago in tropical forests. The jackall's cry is the same as when heard a thousand years ago amid the ruins of Ephesus. The bird has not improved its song, nor varied its style of wondrous nest, since first it flitted from bough to bough in the Garden of Paradise. The commonwealth of the beaver has enacted no new laws—improved upon no old ones. The scream of the eagle, the nocturnal note of the nightingale, the hooting of the solemn owl, have been as unvarying as the rising of the stars, or the music of the spheres. In a word, the bee and all the lower animals have not advanced one step in instinct and intelligence since the day of their creation. Man alone is progressive in intelligence.

The animal beholds the universe as well as man. The former as well as the latter has the five senses, but the animal has only sensation and instinctive motion—man has intervening reason to preside over his sensations and volitions. The animal feels—man feels that he feels. The animal has only impressions, the pictures of external objects—man has an intellect aback of these pictures, which compares them and judges them. The animal's impressions are subjective—man has behind them a reason which renders them to him objective. The animal is a living machine—man, a living soul. In this dignified possession, and with a world-embracing—a world-searching intelligence, he is enabled to exert his dominion over all things, and become lord of creation. His arm, unarmed, is the weakest of instruments; but, guided by reason, his hand constructs implements—artificial hands, which render him more potent than the fabled Briareus. He taxes his inventive genius, and a thousand spindles and shuttles spin and weave textures of comfort and beauty for his clothing. With lever and screw and wedge, he heaves ponderous weights, which all the Titans of old

could not have moved. He investigates the properties of matter, and the causes of things. He lays hold of the corners of the earth, and couples the elements to minister to his necessities. He observes the laws upon which Nature herself works, detects the mechanical powers by which the universe is regulated, and the physical forces unceasingly at work in creation, and compels them as slaves to do his bidding. The flowing stream he converts into a cataract, to turn the wheels of his machinery. He catches the tempest in his outspread sails, and sweeps across the seas. He harnesses as horses the forces of steam, and traverses continents with the rapidity of the flight of the albatross. He disarms electricity of its thunders and its terrors; he prescribes its iron path from city to city, from kingdom to kingdom—aye, and ere long, from continent to continent.

And pliant lightnings on his errands leap,

to tell of the result of an election, the rise and fall of breadstuffs and of cotton, the fate of battles, the storming of a Mamelon, or the slaughter of warring nations before the walls of a Redan or a Malakoff. Shakspeare's Ariel, though a creature of imagination, and ever ready to do the bidding of Prospero, on earth, air, or ocean, was but a feeble foreshadowing of what man's inventive genius has done for man. The cultivated fields with their villas—earth's capitals, the Ninevehs, Babylons, Romes, Londons and Paris's—the pyramids, the solemn temples and gorgeous palaces—the inspired forms hewn from shapeless marble or glowing upon the speaking canvass—the steamers that plough every river and traverse every sea—the din and smoke and clangor of a thousand Birminghams and Lowells,—all these and more, are but the outward manifestations of his genius, and illustrations of his power and his progress.

Vast and almost incalculable are the capabilities of man! Behold him in a state of barbarism: he is naked and covered with rude paint, or clothed in the skins of wild beasts that have been pierced by his arrows, or taken in his snares, and whose flesh with the spontaneous products of the earth is his food. He lives in caverns or rude huts—renders homage to whatever strikes him as awful or wonderful in nature—"sees God in clouds, or hears him in the winds," and worships as his emanations, the leviathan that floats in the waters, or the ox that grazes on their borders. Yet

this same barbarian has innate powers by which he can rise to the highest point of civilization, can rival the Greeks of the age of Pericles, the Romans in the zenith of their glory, and the most advanced of the nations of modern times in science and in art.

But man's highest mark of preëminence over all earthly creatures, and that which approximates him most to his Maker, is his moral nature. He has an appreciation of right and wrong, of virtue and of vice, of good and evil, and a conscience that tells him to follow the one and eschew the other. He estimates the justice and fitness of rewarding virtue and punishing vice. He feels that he is a moral being, subject to the higher law of a superior intelligence. But actions to be virtuous or vicious must be free. No law, human or divine, would punish unavoidable acts. Virtue would deserve no reward were it forced, vice no punishment were it necessitated; or rather, under such circumstances, neither virtue nor vice could even exist. But man is capable of virtue and of vice; therefore, he is free. No wonder, then, that so many battles have been fought for liberty—the highest gift of God to man, or rather for the privilege of acting out this liberty; for the liberty of the mind—the internal power, no tyrant can crush.

The ingenuity and reason of man are certainly wonderful, and sufficiently distinguish him from all other animals. His inventions for time-keeping, for navigation, for manufacturing of various kinds—the niceness and the knowledge displayed in all these and numberless other contrivances, whether designed to minister to his well-being or his curiosity; the microscope that follows the atom as it recedes towards nonentity, counts myriads of beings amid the petals of a morning rose, or thousands of them embalmed and entombed in a cubic inch of stone; the telescope, that sweeps the heavens, and, as it were, brings down the stars and planets, as the microscope elevates the atom; the recorded memories of nations and generations, which enable him to look through all past time, and the reason, which judging from the past, enables him to foretell coming events, as the calculation of the cycles of comets and the eclipses of the heavenly luminaries through all time to come; the intelligence which scrutinizes the farthest regions of space, carries the torch of discovery to the very outskirts of creation, weighs the sun and planets in a balance, resolves the subtlest

combinations of material things, and unravels the complex mechanism of the universe itself—all this is wonderful, and exhibits man as a being of great and exalted dignity.

But not in mere intellect does man's true greatness consist—not in his cunning, his ingenuity, his science, his art, his eloquence, nor his song, but in his moral attributes. The virtues of Socrates and of Plato rank high above the eloquence of Demosthenes and of Cicero. The conquests of Sylla do not dilate the soul, as Brutus rising "refulgent from the stroke of Cæsar's fate," nor as a Washington or a Tell, struggling for their country's liberty.

A Swartz traversing the Indies, a Xavier crossing returnless seas to carry the light of christianity to nations that sat in darkness, a Howard threading the labyrinths of Europe's prison-houses and hospitals, a Chervin and the physicians of our own day hastening from distant cities to the relief of their fellow-man, panic stricken and crushed beneath the blackening gloom and fatal sweep of the plague and the pestilence—present a far grander spectacle than a Bonaparte at Austerlitz, a Wellington at Waterloo, or a Nelson at Trafalgar, rising like a destroying angel over his country's foes.

Why is this? Why is it that certain actions appear to us as the height of the beautiful and sublime? It is because they are the results of freedom, the highest faculty of man, directed to the greatest good of man—free will choosing what is best for time and eternity. It is this, without which man were a machine, that approximates him to Archangels and the Lord. It is in virtue of this freedom that man rises to Heaven, or sinks to Hell—that he merits the applause or the curse of the world. The greatest blessings abused, become the greatest curses—freedom abused is crime—is the greatest of evils; therefore, freedom is the greatest of blessings, and man's highest faculty. What more noble than the highest intellect conjoined with the highest virtue? Alas! such a combination is rare indeed. Socrates was such, Plato was such, St. Paul was such. Nothing in the material universe is half so noble. The rolling worlds themselves have not the dignity and majesty of the intellect that comprehends them—that

> Follows the comet's blazing track,
> Unto creation's bounds and back.

All the accomplishments, all the virtues of which man is capable, combined, would indeed constitute a sort of demigod, compared to whom, the starry glories of midnight, and all the astonishing magnificence of unintelligent creation, would be poor indeed. No—intelligence, grand and lofty as it is, is not man's most ennobling characteristic. Intelligence without virtue, flashes as the baleful light of a falling Lucifer, son of the morning. It does not come up to man's innate idea of man's highest excellence. Virtue is man's chief good and highest prerogative. This is not cant—it is science. Virtue constitutes man's bliss on earth, as sages have taught, and poets sung; and conscience tells us that it is necessary to happiness hereafter. The wicked king, amidst his purple curtains, cries out, "Oh, my offence is rank, it smells to Heaven;" the virtuous laborer is happy in his poverty and toil, the virtuous patriot happy in his dungeon.

> Far more true joy, Marcellus exiled feels,
> Than Cæsar, with the senate at his heels.

Man stands immeasurably above all other animals by the possession of a free will, and his capability of virtue. Let him not degrade himself—let him not underrate himself. Let him never forget what a responsibility it throws upon him to be the object of such a developement, and the close of such a magnificent construction as the vast universe by which he is surrounded. He was formed by the hands and inspired by the breath of God. And though it may be natural enough in view of the glories and vastness of creation, and of his own fallen nature, to exclaim, "What is man, that thou art mindful of him, or the son of man that thou visitest him!"—yet let him always remember that God is mindful of him, and does visit him. Astronomy has tended to degrade man and the earth, his temporary home, by its startling speculations. We have been taught that the Earth is but a grain of sand in the ocean of space, that even the solar system sinks into insignificance compared with the starry host sown in the regions of immensity—that man is but an unobserved pigmy crawling upon a diminutive ball. For one, I thank the author of the "Plurality of Worlds," for having pretty nearly demonstrated that our Earth is an oasis in the desert of creation, that it is the only abode of man. Neptune is too dark and cold, Mercury is

too refulgent and hot, for man's abode. Saturn is as light as cork—the fixed stars have at any rate no discoverable attendant planets—the comets are mainly composed of luminous vapor—the Sun is the largest body in the universe, so far as the telescope can inform us—the Earth is the largest *solid* globe in the solar system, and probably the only one on which man could possibly exist.

But on any supposition, whether the stars and planets are inhabited worlds, or mere "sparks thrown off from the lathe of the mighty Workman"—whether they, like the Earth have brought forth myriads of sentient beings, or are mere "barren flowers of the sky—" man, intellectual and moral man, is the master-piece and greatest wonder—the climax of creation, in space as in time.

Man was created in the image of God—he was created for God—the Earth was made for man. For him kind Nature exerts her mysterious powers—for him the successive geological changes, and the ascending series of animals—for him are the fruits for food, and the flowers for beauty—for him the brilliant plumage of birds, the endless tints of an autumnal foliage, the gorgeous clouds of the setting sun, and the prismatic glories of the rainbow—for him the balmy dews and the nectareous juices—for him the mines yield their treasures and the springs their refreshment and health—for him the dog's fidelity, the horse's strength and agility—for him the fleecy flocks and the cattle of a thousand hills—for him the caravans of the East are forever on the march —for him the canvas of a thousand ships whitens every sea and throngs every port:

> Seas roll to waft him, suns to light him rise,
> His footstool earth, his canopy the skies.

"Man," as has been no less truly than eloquently said, "is the centre of nature and echo of the universe! What nature contains scattered and in fragments, is united in the person of man. Every isolated feeling, every sound in nature, is to pass through his personality and to centre in it. He is the great, perfect, and complete bell, that announces all, every thing; while nature contains only parts of it, the sounds of which are dark and dull."

Man gives dignity to earth, not earth to man. Why, when standing on the Athenian Acropolis, does thy bosom swell, thy

soul dilate? The soil is like any other soil, but it has been the theatre of great deeds of great men. Socrates reasoned on virtue and immortality in these streets and squares, Plato taught in these gardens, Zeno lectured beneath these crumbling porches, the great Stagyrite philosophized in these groves. No, it is not the mere fields of Marathon and Platea and Thermopylæ, nor the watery plains of Salamis—not the mountains of Olympus and Ossa, nor the Hippocrene meandering through groves of rose-laurel and oleander; but the mighty deeds of her heroes, and the immortal songs of her bards, that have forever embalmed Greece in the memory and the affection of mankind.

> Eternal sunshine gilds her yet,
> Her sun of memory ne'er shall set.

Stand on Soracte's height! There are Rome and the Campagna. Like a distant waterfall, the voices of the mighty dead fall on the ears of fancy—for twenty centuries crowd on the memory, and impart sublimity to the scene.

Go to Egypt. The Nile is like other rivers—the pyramids are heaps of stone—the sphynxes are but sculptured granite, but their sad and silent and steady eyes are gazing on the crumbling empire of the Pharaohs. The dead of past ages are there, and the great Persian conqueror, Cambyses, has marched armies over their tombs. Abraham and the patriarchs have walked on these shores—past generations have left their inspiration on the spot.

Why, above all, is the scenery about Jerusalem so soul-stirring? Why have pilgrims for eighteen centuries crowded the barren soil of Palestine? What inspired the crusades? Why met here in deadly strife Saladin and Richard of the lion-heart? Why weep we on the Mount of Olives, or in the precincts of the Holy Sepulchre? The temple is fallen, and has given place to the mosque of Omar, and the land is sterile; but the God-Man has here labored and suffered, and Jerusalem is the Holy City, and Palestine is the Holy Land.

Gentlemen students:—Uphold in your conduct the dignity of man, and the honor of the profession which has his well-being for its object. Always remember that you were created for higher purposes than mere earthly enjoyments—that your profession requires of you a knowledge of man, not only anatomically and

physically, but also mentally and morally; and that to discharge its duties, not only intellect, but also a high degree of virtue is required. May your efforts be in some degree commensurate with the noble science and high mission to which you are devoted.

The wide field of science is before you. May you successfully explore it. Your object is the ascertainment of truth—a knowledge of the universe as God has made it. The search after truth is the highest of intellectual employments—to act in accordance with its dictates, the perfection of moral and religious duty. Seek after and love truth, that priceless jewel, richer than the gold of Ophir or the gems of ocean. You will find it in inorganic matter and its laws—the attractions and repulsions and combinations of its atoms. You will find it in the life-cell and its manifold adaptations to wise and far-off ultimate purposes. You will find it in the anatomy and physiology of vegetables and animals, and in the mental and moral constitution of man. Seek truth in science—seek it in religion. Follow it with philosophical humility and hardihood whithersoever it may lead you, for it can lead only to the greatest good of man, and to God, who is its Author. Life is, indeed, very short, and art and science are very long; the human mind is finite and circumscribed, but you will find time enough, even in a short life, to learn much that is useful to yourselves and your species. You will find time enough to admire and enjoy the vast creation and adore the Creator—to thread the vast chain of being, from the inorganic atom up to man—to muse on the beauties of the flowers, the day-stars of earth, and contemplate the stars, the night-blooming flowers of the sky. You can learn enough to prepare you for entering a higher class, a future and more glorious state of existence. You can do enough to fit you for the immortal honors and unending happiness of a far better life, to which death is but the gate and the pathway.